THE THREE POINTS OF SEATBELTS

Chapter Four of *Unreported Miracles* ©
by Dr. Cal LeMon

The following is Chapter Four, reproduced verbatim-- in its entirety-- with permission of the author, from *Unreported Miracles*, written by Dr.Cal LeMon, a nationally known writer, professional speaker and corporate trainer who is the president of his own firm, The Executive Edge, Inc., Springfield, Missouri:

" I kept procrastinating writing this chapter. After a little conversation with myself (I believe there are some healthy benefits to talking to yourself), I realized it was internal resistance to dealing with this issue.

Every time I make a public presentation on the subject of school bus safety there is the inevitable question, 'Why don't school buses have seat belts?' There is a well-founded answer, but I'm not sure my audiences can always hear it.

There is an initial distinction I need to make. In this chapter when the term "seat belt," is used it will mean a lap belt with just two anchoring points. A "safety belt," on the other hand, is a three-point system which includes a shoulder harness.

Let me begin by reminding you there is no one in government, manufacturers or pupil transportation services who would intentionally ignore a potential safety hazard. Please remember, most of these people are parents too. The quick response by the Federal government and the school transportation industry to the drawstring danger, the fuel tank cage, the stop arm, the specialized mirror requirements, and hundreds of other improvements all clearly say: the business of pupil transportation is safety.

And safety, believe it or not, is the reason there are <u>not</u> seat belts on school buses.

The argument for seat belts at first glance, seems to make sense:

1. 'If safety belts are so important in cars and vans, how can we eliminate them on school buses?'

2. 'We give our children double messages when they have to buckle up in a car but not on a school bus.'

3. 'Seat belts would guarantee safety in a bus rollover.'

4. 'Seat belts would restore order on school buses.'

5. 'Fatalities and injuries would be lowered or eliminated if every child were secured in a seat belt.'

You know what, those may be good reasons to put seat belts on buses. But 'good' reasons are not always smart reasons.

All parties in this debate must first agree to an important ground rule: a final solution cannot be forged on the spongy surface of sentiment. The safety of our children must be decided by parents and experts who have examined the data. If we make decisions because we watched a video of a crashed school bus at 6:00 p.m. or heard NBC's *ER*, Dr. Doug Ross, say after examining incoming patients from a school bus crash, 'When are they going to put safety belts on school buses?', we are victimized by a society which measures truth in Nielsen ratings. Our children deserve smart decisions made on the basis of fact, not feelings.

Before we closely examine the facts behind the National Highway Transportation and Safety Administration (NHTSA) recommendation that seat belts not be placed on school buses, there is an important point to make.

You will find seat belts on some school buses. NHTSA does require seat belts on buses with a gross vehicle weight rating of under 10,000 pounds. These are the smaller buses with a seating capacity which usually does not exceed 20 occupants.

Seat belts are required in these small school buses since their size, weight, and construction are similar to that of the family car, light truck, or van. Such features affect the crash worthiness of a vehicle, and the need for passenger restraints to provide occupant crash protection.

NHTSA has not required seat belts for school buses over 10,000 pounds gross vehicle weight (GVW). There are two states, New York and New Jersey, which have, on their own initiative, required seat belts on these larger buses.

So you will find seat belts on small school buses and in states where they have been mandated by the state laws.

First, seat belts are not required on school buses because a large school bus is not a car. That is not patronizing double-talk.

We assume if police are giving tickets for not wearing your automobile seat belt and every parking lot exit posts a sign, 'Buckle up,' the rules should be the same for yellow school buses.

Contrast these vehicles. Most automobiles place the passenger's feet approximately 18 inches off the road surface; the head is normally within 30 inches of the windshield in the front seats; the frame is intended to support the 'look' or is nonexistent above the occupant (convertibles); and many automobiles augment the use of a safety belt with an air bag system.

The design of a bus body places the passenger's feet approximately 30 inches above the road surface which protects the occupant from direct side impact crashes. This is the main reason over-the-road motor coaches, transit buses and school buses are not required to have either seat belts or safety belts for passengers.

For the passenger, there are no dashboard protrusions on a school bus. Your child slips into a seat which is comprised of a passive safety system. The system is called 'compartmentalization.'

Second, seat belts are not required on school buses because compartmentalization has proven to be a passive, effective form of school bus passenger restraint.

The Federal School Bus Passenger Seating and Crash Protection standard requires strong, well padded, evenly-spaced, forward-facing, energy-absorbing seating which does not require your child to do anything to be safe. In the event of a crash, the system provides for impact against the energy-absorbing seat in front of the occupant or the padded side panel. As a caring parent, you want to know, 'Does this system really work?'

Since we agreed this discussion would be built on dada, not emotion, we need to look at the testing results to decide if compartmentalization is better or worse than mandating seat belts.

If you are like me, when I need to know the right answer, I will consult an 'expert.' If the question has to do with my body, I will call my physician. If I am in doubt about a decision which has legal implications for my business, I will call my attorney. I have to trust the people in my life who invest their careers in one specific area. Let's do the same here.

The last time there was statistical evidence gathered on this issue, it was the late 1980's.

In 1987, the National Transportation Safety Board completed a detailed analysis of 43 serious accidents involving large school buses. The Board reached several conclusions concerning seat belts, most notable that most school bus occupant fatalities and serious injuries were 'attributable to the occupants' seating position being in direct line with the crash forces. It is unlikely that the availability of any type of restraint would have improved their injury outcome.'

In other words, if a 30,000 pound school bus is directly hit by a 75,000 pound tractor semi-trailer, seat belts would not be a factor in survivability for those occupants directly in line of the crash.

The NTSB, the experts in crash evaluations, concluded after investigating these 43 serious accidents that: (1) in most of the accidents seat belts would not have made any difference in injury outcome, (2) in a few cases, seat belts would have reduced injuries and fatalities and, (3) in some cases, seat belts would actually have caused fatalities or increased injury levels.

As recently as September 21, 1999 the National Transportation Safety Board once again concluded that the installation of lap belts or lap/shoulder belts in current school bus designs would likely produce no improvements in passenger crash protection.

Please note the NTSB investigated the aforementioned Fox River Grove, Illinois railroad crossing crash which took the lives of seven and injured 24 of the occupants. Their conclusion, after exhaustive testing and examination of the crash site, was seat belts would have undoubtedly raised the fatality count. The students in the back of the bus only had milliseconds to react to the oncoming train to move quickly to the front of the bus. Unlatching seat belts would have taken additional milliseconds which would have cost more lives.

In 1989, the National Academy of Sciences completed a study at the direction of the United States Congress on 'the principal causes of fatalities and injuries to school children riding in school buses and the use of seat belts in school buses and other measures that may improve the safety of school bus transportation.'

The Academy was directed to 'determine those safety measures that are most effective in protecting the safety of school children while boarding, leaving and riding in school buses.' In its conclusions, the Academy noted the 'the overall potential benefits of requiring safety belts on large school buses are insufficient to justify a Federal requirement for mandatory installation.'

To back up that conclusion, here are some numbers for your consideration. During 1995, 12 occupants in a school-bus-body type vehicle died in a crash. While each of these fatalities was a tragedy that everyone wishes had never happened, those 12 deaths pale when compared to the 8,168 children between the ages of 5 and 20 who died as passengers or drivers in all other types of motor vehicles during the same year.

We learned in Chapter Three that the real danger zone for your child is *outside*, not inside a school bus. Serious accidents are so rare for large school buses that a study on seat belt effectiveness in New Jersey, one of the states which has mandated their installation and use, has been delayed because there is not sufficient data for statistical comparisons.

If the danger zone is outside the bus, would it not be better to turn attention to ideas like loudspeakers for drivers to warn children and the public of deboardings, electronic or mechanical sensors to detect children within 10 feet of the school bus body or improved cross-view mirrors?

The findings of the NTSB and NAS confirm compartmentalization has definite advantages as a passive restraint system for your child's safety.

In addition, there are other dangers with lap belts, especially to smaller children, which need to be explored.

When you strap yourself or your child into a seat belt in your car or van, you will use a 'three point restraint' system. Do you remember when only lap belts were required in automobiles? In 1968 all of that changed when the effectiveness of the 'shoulder' harness was proven to dramatically reduce fatalities and injuries.

Lap belts, when used in school buses built after April 1, 1977 (compartmentalization was mandated), have two serious flaws as an active restraint system.

First, with younger children (3 through 12 years of age) there is the danger of 'submarining' (sliding out of the lap belt when the school bus in involved in a rear-end collision) and sustaining significant internal injuries.

Physiology is at the center of this debate. As and adult you can feel the top of your hip joints (anterior superior iliac spines) which are approximately an inch above your thighs. This bone structure encases your pelvic area. When you put on a lap belt across this area, the belt is supported on either side by this skeletal structure.

This is not the case with small children. The iliac spines or hip joints are still developing until about age nine or ten. The child does not begin to form secondary ossification centers in this skeletal area until about the age of 12 in girls and ages 13 or 14 in boys. So in younger children there is a cartilage which is still flexible and conforming to external trauma.

In a decelerating crash (the school bus comes to a sudden stop), the rigid seat belt will not meet the resistance of a skeletal frame and will drive the belt into the internal organs. This trauma can cause extensive internal bleeding, crushed kidneys, ruptured bladders and spinal injuries.

There is a second physiological reason why the lap belt may be injurious. In 1985, the Council on Road Trauma of Hamilton, Ontario, Canada, conducted scientific crash tests on three school buses with anthropomorphic dummies. Using video cameras and body sensors, the buses were driven at 30 mph directly into a concrete wall.

The conclusion from Transport Canada was, 'The use of lap seat belts in any of the 3 sizes of recent model school buses which were tested may result in more severe head and neck injuries for a belted occupant than for an unbelted one, in a severe frontal collision.'

What is going on here that this test would come up with that conclusion? When the child was restrained only in the pelvic area, the head was thrust into the back of the next seat creating extreme pressure on the neck and spine. In the words of the study, '. . . restrained dummies were generally subjected to higher maximum resultant head accelerations, more sudden head accelerations, and more severe extensions of the neck than unrestrained dummies.'

As you can see, the data suggests there are some significant concerns about using just a lap belt with the passive compartmentalization system.

Well, what about the 3 point 'safety belt' as an alternative? This is one of those situations where we cannot have it both ways.

It is an engineering possibility to put safety belts on school buses. The anchoring of the shoulder harness would, of necessity, make the seat back more rigid in order to endure the energy of a crash. In effect, compartmentalization would not be necessary, or advisable, because of some of its energy-absorbing qualities.

I think you see the problem. The school bus has to have either a three-point safety belt system or compartmentalization. The safety belt will work well if **everyone** is buckled up. If 10 percent of the students in a 60 passenger school bus are unbelted in a severe crash, they become victims of an interior that is not as 'occupant-friendly' as compartmentalization. The advantages of compartmentalization have been sacrificed for the goal of having 100% compliance that everyone will 'buckle up.'

There is a question bouncing around in my mind right now, 'Is 100% compliance realistic?' The latest compliance statistics from the National Safety Council on passenger care usage of safety belts is approximately 60 percent. Even in New Jersey, from my personal conversations with pupil transportation professionals, a significant number of students do not use seat belts even though there is a mandatory seat belt policy in school buses.

Let's put all of this together on why compartmentalization is the best choice:

1. The experts have concluded, after the best scientific research, there is no identified safety problem in large school buses that the installation of seat belts would solve.

2. There are strong physiological arguments against using seat belts, especially with smaller children.

3. The three-point safety belt is an effective restraint system but would require the elimination of some critical components of compartmentalization.

Third, seat belts are not required on school buses because monitoring the active restraint system would decrease the driver's ability to safely operate a bus.

Some of the larger school buses have an approved seating capacity of 84 passengers. Consider for a moment, all of the children enter the bus and take their places and now the driver must come down the aisle and visually check to make sure each occupant has his or her seat belt attached and is wearing it correctly, low around the hip bone.

What happens to the driver's concentration when the seat belt is released while the bus is moving? What happens to a driver's concentration when an unused seat belt hits a child in a sudden stop? What happens when the seat belt is used as a weapon by another child? What happens, and this is a horrendous thought, if the bus is on fire or in a major accident and the driver is hurt and cannot assist a child to release a seat belt?

One of the options, and several school districts have used this, is to hire 'bus monitors' who would make sure seat belts were used and used correctly. There is a financial cost to consider here. Back in 1977 the Southwest Research Institute conducted a research project in California entitled, 'Study Relating to Seat Belts for Use in Buses.' The conclusion was (in 1977 dollars) it would cost $45,670,000 per year to place monitors on large buses in just this one state. Can you imagine that cost today!

This chapter has provided three information-based reasons why seat belts are not required by the Federal government on larger school buses. I am asking you to carefully consider the facts and reasoning here.

While the seat belt debate will most likely continue, we need to keep asking, out loud, is this the best use of our attention and resources? Are there other areas of your child's school transportation that actually need more immediate attention?

The stakes are high here. We are making decisions for the people who matter most to us. . . our children. We cannot afford to offer their futures up on the altar of adult argumentation."